Epidemiological survey for antibodies to Lassa virus in selected populations in Jos, Nigeria

Study team
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Background
Lassa virus (LASV), a human pathogen of the family Arenaviridae, is a rodent-born virus that causes Lassa fever (LF). The disease takes its name from Lassa village in northern Nigeria near Jos, where it was first described in 1960. Since then it has spread to other parts of Nigeria and through West Africa. Sero-epidemiological surveys revealed Lassa antibodies in up to 50% of population in Sierra-Leone, Guinea, and Nigeria, bringing the population at risk to 59 million with an annual incidence of illness of 3 million and thousands of deaths. LASV is transmitted from rodents to humans by direct contact and/or by mucosal exposure by inhalation or ingestion of dust or droplets contaminated with viruses; inappropriate food storage, catching, cooking, and eating rats correlate with LASV infection and LF disease. Sporadic outbreak of LF still occurs in Nigeria today; the most recent occurred in March 2008 and killed 2 medical doctors in Ebonyi, as reported by the Nigerian government.

The Institute of Human Virology, University of Maryland, through Drs. Gallo and Abimiku established over 15 years collaboration with the government of Plateau State and the Plateau State Specialist Hospital (PSSH), a tertiary hospital which has led to the collaborative establishment of a state of the art research facility on the PSSH grounds referred to at the Plateau State Human Virology Research Center (PLASVIREC) in Jos.

In light of the safety concerns surrounding the possible role that antibodies to viral vectors could play in acquisition of HIV-1 as exemplified by Adenovirus antibodies in recent HIV-1 vaccine concept trials (STEP and Phambili), we propose to document the prevalence of antibodies to Lassa virus (LASV) in convenient serum/plasma samples from 3 groups of patients/clients at the PSSH and PLASVIREC: HIV+ individuals, healthcare providers, and patients with flu-like symptoms or fever at PSSH.

Study and Experimental design
We propose to screen for LASV antibodies from convenient serum/plasma samples from 3 study groups: The first group are patients presenting with fever or flu-like symptoms at PSSH whose blood has been drawn for various tests (such as malaria parasite detection, typhoid antibodies, blood culture etc) according to the standard of care at PSSH. Paired serum samples tested for increased titers to Salmonella typhi as part of the diagnosis for typhoid fever will also be included in the samples to be tested; the second group of samples will come from healthcare workers whose blood is taken for routine laboratory tests or for specific medical condition; this group has been described in the past to elicit LASV antibodies as a result of regular contact with LASV infected patients, usually unknowingly; the third group of samples will come HIV+ persons from the VCT center at PLASVIREC where samples screened
for HIV are archived (usually for 2 weeks until the results are dispatched and clients counseled). For this study, a total of 300 convenient plasma or serum sample will be analyzed. Two hundred samples will come from achieved HIV+ serum/plasma samples from the VCT center; 50 from patients with fever treated/admitted at PSSH; and the final 50 serum/plasma samples will be from health care workers caring for these patients at PSSH. Basic demographic information will be obtained from the hospital records and where possible additional information on area of living (rural vs urban) and living conditions of participants will be collected. All samples will be stripped of all identifiers before testing for LASV antibodies at PLASVIREC.

For the assay, LASV IgG antibodies will be detected using the ELISA technique. Detection of Lassa IgG antibodies indicate a previous contact with Lassa virus not acute infection. Where possible, samples that are positive for LASV IgG will be further tested with RT-PCR for the detection of virus which is present in acute infection. An aliquot of LASV IgG positive samples will be pooled for use to detect LASV IgM antibodies using the sandwich ELISA (MAC ELISA) detection technique.

This study will be partly supported by the IHV-UMD Fogarty AIDS International Training & Research Program (AITRP)(PI: William Blattner) therefore the study will be carried out in collaboration with the research team at PLASVIREC but more importantly, a laboratory scientist at PLASVIREC (Sophia Osawe) will understudy the research associate (Juan Zapata) from IHV-UMD who will be performing the assay at PLASVIREC for 3 weeks. The trainee will continue to perform the assay after the research associate has returned to IHV until the 300 samples are analyzed. In addition, the trainee will also get a chance to participate in the standardization of the IgM MAC ELISA technique using the pooled sera from Jos and RT-PCR at Dr. Lukashevich’s laboratory at IHV.